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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

AUTOMOBILE-SERVICE-STATION ATTENDANT 7-60.500

B-469 or S-198

U. S. Employment Service in
Cooperation with
Pennsylvania State Employment Service

September 1962

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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

AUTOMOBILE-SERVICE-STATION ATTENDANT 7-60.500

B-469 or S-198

Summary

The General Aptitude Test Battery, B-1002A, was administered to a sample of 52 men employed as Automobile-Service-Station Attendant 7-60.500 at eleven service stations located in Philadelphia, Pennsylvania. The criterion consists of supervisory ratings made on the descriptive rating scale. On the basis of mean scores, standard deviations , correlations with the criteria, job analysis data, and their combined selective efficiency, Aptitudes N-Numerical, F-Finger Dexterity, and M-Manual Dexterity were selected for inclusion in the test norms.

GATB Norms for Automobile-Service-Station Attendant 7-60.500

Table I shows, for B-1001 and B-1002 for Automobile-Service-Station Attendant 7-60.500

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
N	CB-1-D CB-1-I	95	N	Part 2 Part 6	90
F	CB-1-O CB-1-P	85	F	Part 11 Part 12	80
M	CB-1-M CB-1-N	90	M	Part 9 Part 10	85

Effectiveness of Norms

The data in Table V indicate that 13 of the 17 poor workers, or 76 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 76 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 26 of the 30 workers who made qualifying test scores, or 87 percent, were good workers.

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Automobile-Service-Station Attendant 7-60.500.

II. Sample

During the months of June, July, August, September and October of 1959, and January of 1960, the General Aptitude Test Battery, B-1002A, was administered to 53 men employed as Automobile-Service-Station Attendants 7-60.500 at various service stations located in Philadelphia, Pennsylvania. One worker was eliminated from the sample because his test scores were considered invalid. The final sample consisted of 52 men. The names of the companies and the number of workers in the sample for each, are as follows:

Company	Number in Sample
Atlantic	12
Esso	10
Texaco	3
Cities Service	4
Gulf Oil	4
Sunoco	11
Amoco	3
Tydol	1
Sinclair	1
Mobil	3
Sear Roebuck	1
	N = 53

The number listed after each company comprises the total number of attendants employed by each participating service station. Hires are obtained through newspaper advertisements, or personal application. Age and educational requirements are not fixed, although high school graduates or those with a minimum of two years of high school education are preferred. On-the-job training is given by the dealer, station manager, or an experienced attendant. Three months of training time is required for inexperienced workers. All individuals in this experimental sample are experienced workers, and were selected on a voluntary basis.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

Automobile-Service-Station Attendant 7-60.500

N = 52

	M	σ	Range	r
Age (years)	31.8	10.8	17-58	.121
Education (years)	10.8	1.8	5-16	.194
Experience (months)	95.7	77.5	3-360	.006

There are no significant correlations between age, education, or experience and the criterion. The data in Table II indicate that the sample is suitable for test development purposes with respect to age, education, and experience.

III. Job Description

Job Title: Automobile-Service-Station Attendant 7-60.500

Job Summary: Performs duties at automobile service station as requested by customer. Supplies car or truck with oil, water, air and gasoline. Changes oil and lubricates automobile or truck. May sell and install accessories, change and repair tires and wash automobiles.

Work Performed: Receives specific instructions relative to station activities from manager; otherwise performs duties in accordance with established routine.

Lubricates cars and trucks according to standard procedure; ascertains work to be done from customer and prepares work ticket. May advise customer as to proper grade, type or size of product, referring to charts as necessary, and may solicit additional services. Performs all or any portion of lubrication; drives vehicle on hydraulic lift, raises lift to desired height, and applies lubricant to designated spots on under part of car using grease guns; checks under part of car for trouble spots and, if any are found, notifies customer.

May drain oil from crankcase and fill with new oil. Checks oil level in transmission and checks oil level in differential.

In cars with automatic transmission, checks oil level by withdrawing "dip stick" indicator. Removes cap to visually check level of brake fluid in master cylinder; in same manner checks level of oil in power sterring and/or power brakes, where present. Checks level of water in battery and adds water if necessary. Checks pressure of air in tires using tire gauge. May perform any additional services listed on work ticket. May repack front wheel bearings, pack universal joints, and spring covers, and adjust sparkplugs, clean air clearners, etc.

May perform miscellaneous services, such as: testing, charging and installing storage batteries; repairing, installing or removing tire chains; replacing bulbs, sealed beam units, windshield wiper blades and arms, radiator and heater hose, thermostats, fan belts; flushing radiators, checking strength of anti-freeze solution, etc.

Maintains station's cleanliness and equipment. Sweeps and cleans floors, keeps washrooms clean and replenishes supplies. Washes windows, keeps equipment clean, orderly and in good condition. Removes ice and snow.

IV. Experimental Battery

All the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of supervisory ratings on the Descriptive Rating Scale, Form Sp-21. Ratings were prepared during the same months in which the experimental battery was administered. The Descriptive Rating Scale consists of nine items covering different aspects of job performance. Each item has five alternative statements regarding the adequacy of performance, weighted one to five. Possible criterion scores ranged from 9 to 45. The actual range was 25 to 45 with a mean score of 35.942 and a standard deviation of 4.733. An attempt was made to secure a second set of ratings but the raters felt there would be no change in the ratings; therefore, only the original ratings were used.

Since only one set of descriptive rating scale criterion data was obtained for the experimental sample, an estimated reliability of the criterion was obtained by a relationship between the total descriptive rating scale scale scores and the ratings on Item I ("all around ability") of the scale. A reliability coefficient of .790 was obtained.

Statistical and Qualitative Analysis

A. Statistical Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Automobile Service Station Attendant 7-60.500
N = 52

Aptitudes	M	σ	r
G-Intelligence	96.4	17.4	.093
V-Verbal Aptitude	92.8	17.7	-.020
N-Numerical Aptitude	96.8	17.7	.101
S-Spatial Aptitude	98.4	18.0	.080
P-Form Perception	93.4	15.0	-.025
Q-Clerical Perception	96.5	13.0	.175
K-Motor Coordination	93.7	14.6	.237
F-Finger Dexterity	96.8	19.0	.092
M-Manual Dexterity	114.9	20.7	.178

Aptitudes N, S, F and M have the highest mean scores and aptitudes Q and K have relatively low standard deviations. For a sample of 52 cases, correlations of .354 and .273 are significat at the .01 level and the .05 level of confidence, respectively. There are no significant correlations between the aptitudes and the criterion for this sample.

B. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Numerical (N) - Important in computing prices, discounts and pro rata allowances as well as in taking inventory and keeping records of sales, receipts, etc.

Form Perception (P) - Required for performance of activities such as reading meters and gauges; examining parts, tire leaks and in making repairs and adjustments.

Manual Dexterity (M) - Virtually all the work performed is done so by handling tools and equipment.

Finger Dexterity (F) - Required in all phases of repairs and services in which hand tools and equipment are used.

Clerical (Q) - Reads gasoline meters at beginning and end of work shift or day. Required in reading fuel meters, gauges, charts, etc., when servicing vehicles.

On the basis of the job analysis data, the following aptitudes are considered obviously unimportant for performing the duties of this job and are considered "irrelevant" aptitudes: V-Verbal

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data Important			X		X	X		X	X
Irrelevant		X							
Relatively High Mean			X	X				X	X
Relatively Low Sigma						X	X		
Significant Correlation with Criterion									
Aptitudes to be considered for trial norms			N			Q		F	M

Trial norms consisting of various combinations of Aptitudes N, Q, F, and M with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of N-90, F-80, and M-85 had the best selective efficiency.

VII. Concurrent Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A criterion critical score of 34 was used and resulted in 17 of the 52 workers or 33 percent of the sample being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes N, F, and M with critical scores of 90, 80 and 85, respectively, and the dichotomized criterion for Automobile-Service-Station Attendant 7-60.500. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for Automobile-Service-Station Attendant 7-60.500

(N-90, F-80, and M-85)

N = 52

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	9	26	35
Poor Workers	13	4	17
Total	22	30	52

$r_{tet} = .72$ $\quad \chi^2 = 10.087$

$\sigma_{r_{tet}} = .23$ $\quad P/2 = .005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes N, F, and M with minimum scores of 90, 80, and 85, respectively, have been established as B-1002 norms for the occupation of Automobile-Service-Station Attendant 7-60.500. The equivalent B-1001 norms consist of N-95, F-85, and M-90.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for allocation to any of the existing 35 occupational aptitude patterns (10/61). The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.